

Notice of Allowability

Application No.

10/079,127

Examiner

John J. Zimmerman

Applicant(s)

CLARK ET AL.

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment received June 8, 2004.
2. ☒ The allowed claim(s) is/are 1-14.
3. ☒ The drawings filed on 08 June 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

John J. Zimmerman
Primary Examiner
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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The claims submitted with the June 8, 2004 amendment were submitted in noncompliant format since the body of a claim should not be included when a claim is canceled (e.g. claim 15). The purpose of this examiner's amendment is simply to resubmit the claims of the applicant's amendment of June 8, 2004 in a compliant format.

The amendment to the claims is attached to this letter.

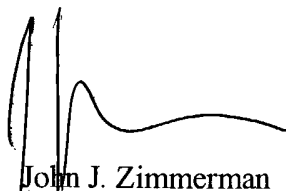
Drawings

The drawings received on June 8, 2004 are approved. The labeling of Figure 1 as "Prior Art" has overcome the prior objection to the drawings.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Zimmerman whose telephone number is (571) 272-1547. The examiner can normally be reached on 8:30am-5:00pm, M-F. Supervisor Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John J. Zimmerman
Primary Examiner
Art Unit 1775

jjz
June 16, 2004

1. (currently amended) A method of continuously producing a lead alloy strip having high initial tensile strength and elongation before yield greater than 40% for battery electrode plates comprising heating a lead alloy containing 0.05 – 0.09 wt% calcium, 0.6 – 1.8 wt% tin, 0.01 – 0.06 wt% silver and the balance lead to a temperature above the melting point of the lead alloy for feeding of the molten lead alloy to an extruder having a die block with a desired die profile, cooling the molten lead alloy below the melting point of the lead alloy, forcing the lead alloy through the die block at a pressure up to 2000 atmospheres to produce an extrusion with zero porosity having a desired strip profile and a homogeneous, equiaxed lead alloy grain structure, and rapidly cooling the extrusion while maintaining the extrusion under tension by quenching to acquire a strip having a homogeneous, equiaxed lead alloy grain structure with a predetermined grain size in the range of 10 to 300 microns.
2. (original) In a method as claimed in claim 1, extruding the lead alloy in the shape of a tube extrusion, slitting and opening the tube, and rolling the opened tube into a planar strip prior to rapidly cooling the extrusion.
3. (original) In a method as claimed in claim 1, extruding the lead alloy in the shape of a planar strip.
4. (original) In a method as claimed in claim 1, extruding the lead alloy to produce an extrusion having a desired profile.
5. (previously presented) A method as claimed in claim 1, in which the lead alloy is heated to a temperature in a temperature range from the melting point of the lead alloy up to 380°C for feeding of molten lead alloy to the extruder having a screwhousing, cooling the molten lead alloy within the screwhousing to a temperature below the melting point of the lead alloy for extrusion of the lead alloy through the die block, rapidly cooling the extruded strip under tension by quenching and winding the cooled extruded strip into a coil.
6. (previously presented) A method as claimed in claim 1 or 2, additionally comprising slitting and expanding the cooled planar strip into an expanded diamond grid mesh by rotary expansion wherein the ratio of the height of the diamond to the width of the diamond of the diamond grid mesh is up to almost 1.
7. (previously presented) A method as claimed in claim 1 or 2, additionally comprising forming the cooled planar strip into an expanded grid by reciprocating expansion, punching, machining, waterjet cutting, spark cutting or laser cutting.

8. (original) A method as claimed in claim 4, rapidly cooling the extrusion under tension and winding the cooled extrusion into a coil.

9. (original) A method as claimed in claim 4, additionally comprising slitting and expanding the cooled extrusion profile into an expanded grid by rotary expansion.

10. (original) A method as claimed in claim 4, additionally comprising forming the cooled extrusion profile into an expanded grid by reciprocating expansion, punching, machining, waterjet cutting, spark cutting or laser cutting.

11. (currently amended) An extruded lead alloy strip for battery electrodes produced by the method of any of claims 1 ~~-5~~ and 8 - 10 [through 9] in which the lead alloy strip has zero porosity and high initial tensile strength and high elongation before yield greater than 40% with a homogeneous, equiaxed grain structure in the size range of 10 to 300 microns.

12. (previously presented) An expanded diamond-grid mesh produced by a method according to any of claims 8 or 9 for use as a battery electrode, said battery grid having a diamond shape with a height of the diamond to the width of the diamond of up to almost 1.

13. (previously presented) A lead acid battery having a plurality of battery electrodes produced by a method according to any of claims 8 or 9.

14. (currently amended) A method as claimed in claim 1 or 2, in which the lead alloy contains [0.05 to 0.07] 0.06 - 0.08 wt% calcium, [0.6 to 1.8] 1.4 - 1.6 wt% tin, 0.010 - 0.035 wt% silver and the balance lead.

15 (cancel)